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Please find below and/or attached an Office communication concerning this application or proceeding.

7

Office Action Summary	Application No.	Applicant(s)	
	09/768,083	ZHANG ET AL.	
	Examiner	Art Unit	
	Kandasamy Thangavelu	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *January 23, 2001; February 17, 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *January 23, 2001*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-20 of the application have been examined.

Drawings

2. The drawings submitted on July 23, 2001 are accepted.

Specification

3. The disclosure is objected to because of the following informalities:

Page 4, Lines 2-3, (Amendment A, Page 2, Para 2), "Logical step 101 allows input of CPU into a computer program" appears to be incorrect and it appears that it should be "Logical step 101 allows input of CPU information into a computer program".

Page 4, Lines 14-15, "Finally, in the number of bars of each heat sink is included in this" appears to be incorrect and it appears that it should be "Finally, the number of bars of each heat sink is included in this".

Page 4, Lines 21-23, "logical steps 101 and 102 provides an estimate of the electronic field and magnetic field distribution. In logical step 103, based on the electronic and magnetic fields" appears to be incorrect and it appears that it should be "logical steps 101 and 102 provides an estimate of the electrical field and magnetic field distribution. In logical step 103, based on the electrical and magnetic fields".

Page 8, Lines 10-11, "magnetic resonance of the heat sin (f_r)" appears to be incorrect and it appears that it should be "magnetic resonance of the heat sink (f_r)".

Page 9, Lines 20-22, (Amendment C, Page 4, Para 5), "After solvinging the transforming data using the fast Fourier transform, logical step 111, the confirms that the electromagnetic interference is at an acceptable level, logical step 112. If the electromagnetic interference is at an acceptable level, the process stops, logical step 130." appears to be incorrect and it appears that it should be "After obtaining the transforming data using the fast Fourier transform, logical step 111, the process confirms that the electromagnetic interference is at an acceptable level, logical step 112. If the electromagnetic interference is at an acceptable level, the process stops, logical step 113".

Appropriate corrections are required.

Claim Objections

4. The following is a quotation of 37 C.F.R § 1.75 (d)(1):

> The claim or claims must conform to the invention as set forth in the remainder of the specification and terms and phrases in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

5. Claims 6, 10, 16 and 18 are objected to because of the following informalities:

Claim 6, Line 3, "determining a number of dins and a number of bars of the heat sink" appears to be incorrect and it appears that it should be "determining a number of fins and a number of bars of the heat sink".

Claim 10, Line 3, "determining a number of dins and a number of bars of the heat sink" appears to be incorrect and it appears that it should be "determining a number of fins and a number of bars of the heat sink".

Claim 16, Lines 4-5, "the number and fins and the number of bars of the heat sink determined by" appears to be incorrect and it appears that it should be "the number of fins and the number of bars of the heat sink determined by".

Claim 18, Lines 4-5, "the number nad fins and the number of bars of the heat sink determined by" appears to be incorrect and it appears that it should be "the number and fins and the number of bars of the heat sink determined by".

Claim 18, Line 7, "determining a number of dins and a number of bars of the heat sink" appears to be incorrect and it appears that it should be "determining a number of fins and a number of bars of the heat sink".

Appropriate corrections are required.

Claim Interpretations

6. In Claim 6, Line 3, "determining a number of dins and a number of bars of the heat sink" is interpreted as "determining a number of fins and a number of bars of the heat sink".

In Claim 10, Line 3, "determining a number of dins and a number of bars of the heat sink" is interpreted as "determining a number of fins and a number of bars of the heat sink".

Claim 16, Lines 4-5, "the number and fins and the number of bars of the heat sink determined by" is interpreted as "the number of fins and the number of bars of the heat sink determined by".

Claim 18, Lines 4-5, "the number nad fins and the number of bars of the heat sink determined by" is interpreted as "the number and fins and the number of bars of the heat sink determined by".

Claim 18, Line 7, "determining a number of dins and a number of bars of the heat sink" is interpreted as "determining a number of fins and a number of bars of the heat sink".

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

8. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1, 6, 12, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Namiki** (U.S. Patent Application 2002/0099510) in view of **Treiber et al.** (U.S. Patent 6,664,463).

9.1 As per claim 1, **Namiki** teaches Electromagnetic wave analyzer and computer-readable medium storing programs for electromagnetic wave analysis. **Namiki** teaches method for calculating electromagnetic radiation (Page 1, Para 0002); comprising:

modeling characteristic radiation from the central processing unit as a modulated Gaussian pulse (Page 7, Para 0081); and

estimating the electromagnetic field produced by the central processing unit using finite differences in time domain (FDTD) to solve Maxwell's equation (Page 1, Para 0002 and Para 0004; Page 2, Para 0030; Page 3, Para 0044).

Namiki teaches determining the distance of the point where the electromagnetic filed is estimated from the source of the field (Page 1, Para 0004 and 0005). **Namiki** does not expressly teach determining the distance of a central processing unit from a heat sink. **Treiber et al.** teaches the electromagnetic radiation generated by an electronic component such as a processor and dissipating heat from the electronic component using a heat sink and a conductor connected to the heat sink (Abstract, L1-9; CL22, L9), because that shields the electromagnetic radiation

generated by the electronic component (CL3, L37-44). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to combine the method of **Namiki** involving determining the distance of the point where the electromagnetic filed is estimated from the source of the field with the method of **Treiber et al.** that included the electromagnetic radiation generated by an electronic component such as a processor. One would be motivated because that permits determining the amount of shielding of the electromagnetic radiation generated by the electronic component by the use of the heat sink and a conductor connected to the heat sink.

Namiki does not expressly teach determining a number of fins and a number of bars of the heat sink. **Treiber et al.** teaches determining a number of fins (CL5, L7-19; CL5, L58-66), because the heat transfer fins facilitate convective heat transfer from the heat sink to the air that flows past the processor assembly(CL5, L15-19) and it is inherent that the quantity of heat transferred is proportional to the area of the fins and hence the number of the fins. **Treiber et al.** teaches determining a number of bars of the heat sink CL1, L37-42; Cl1, L64 to CL2, L17; CL5, L66 to CL6, L5; CL7, L56-62), because the bars (conductor) provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the electronic component such as the processor is mounted, thus shielding the electromagnetic radiation generated by the electronic component (CL3, L37-44) and it is inherent that the shielding provided to the electromagnetic radiation is proportional to the number of bars and their size. It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Treiber et al.** that included determining a number of fins and a number of bars of the heat sink. One would be motivated because the heat

transfer fins would facilitate convective heat transfer from the heat sink to the air that flows past the processor assembly and the quantity of heat transferred would be proportional to the area of the fins and hence the number of the fins; the bars (conductor) would provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the electronic component such as the processor was mounted, thus shielding the electromagnetic radiation generated by the electronic component and the shielding provided to the electromagnetic radiation would be proportional to the number of bars and their size

9.2 As per claim 6, **Namiki** teaches modeling characteristic radiation from the central processing unit as a modulated Gaussian pulse (Page 7, Para 0081); and

estimating the electromagnetic field produced by the central processing unit using finite differences in time domain (FDTD) to solve Maxwell's equation (Page 1, Para 0002 and Para 0004; Page 2, Para 0030; Page 3, Para 0044).

Namiki teaches determining the distance of the point where the electromagnetic filed is estimated from the source of the field (Page 1, Para 0004 and 0005). **Namiki** does not expressly teach a method of designing a computer system comprising determining the distance of a central processing unit from a heat sink. **Treiber et al.** teaches a method of designing a computer system comprising an electronic component such as a processor and dissipating heat from the electronic component using a heat sink and a conductor connected to the heat sink (Abstract, L1-9; CL22, L9), because that shields the electromagnetic radiation generated by the electronic component (CL3, L37-44). It would have been obvious to one of ordinary skill in the art at the

time of Applicants' invention to combine the method of **Namiki** involving determining the distance of the point where the electromagnetic filed is estimated from the source of the field with the method of **Treiber et al.** that included designing a computer system comprising an electronic component such as a processor with a heat sink. One would be motivated because that permits designing a computer system limiting the amount of the electromagnetic radiation generated by the electronic component by the use of the heat sink and a conductor connected to the heat sink.

Namiki does not expressly teach determining a number of fins and a number of bars of the heat sink. **Treiber et al.** teaches determining a number of fins (CL5, L7-19; CL5, L58-66), because the heat transfer fins facilitate convective heat transfer from the heat sink to the air that flows past the processor assembly(CL5, L15-19) and it is inherent that the quantity of heat transferred is proportional to the area of the fins and hence the number of the fins. **Treiber et al.** teaches determining a number of bars of the heat sink CL1, L37-42; Cl1, L64 to CL2, L17; CL5, L66 to CL6, L5; CL7, L56-62), because the bars (conductor) provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the electronic component such as the processor is mounted, thus shielding the electromagnetic radiation generated by the electronic component (CL3, L37-44) and it is inherent that the shielding provided to the electromagnetic radiation is proportional to the number of bars and their size. It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Treiber et al.** that included determining a number of fins and a number of bars of the heat sink. One would be motivated because the heat transfer fins would facilitate convective heat transfer from the heat sink to the air that flows past

the processor assembly and the quantity of heat transferred would be proportional to the area of the fins and hence the number of the fins; the bars (conductor) would provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the electronic component such as the processor was mounted, thus shielding the electromagnetic radiation generated by the electronic component and the shielding provided to the electromagnetic radiation would be proportional to the number of bars and their size

9.3 As per claim 12, **Namiki** teaches computer program product encoded in computer readable media (Fig 4; Page 6, Para 0071; Page 9, Para 0115); computer program product comprising:

a second set of instructions, executable on a computer system, configured to model characteristic radiation from a central processing unit as a modulated Gaussian pulse (Page 7, Para 0081); and

a third set of instruction, executable on a computer system, configured to estimate electromagnetic fields produced by the central processing unit using finite differences in a time domain to solve Maxwell's equation (Page 1, Para 0002 and Para 0004; Page 2, Para 0030; Page 3, Para 0044).

Namiki teaches a first set of instructions, executable on a computer system, configured to read data determining the distance of the point where the electromagnetic filed is estimated from the source of the field (Page 1, Para 0004 and 0005). **Namiki** does not expressly teach a first set of instructions, executable on a computer system, configured to read data determining the

distance of a central processing unit from a heat sink. **Treiber et al.** teaches a first set of instructions, executable on a computer system for designing a computer system comprising an electronic component such as a processor and dissipating heat from the electronic component using a heat sink and a conductor connected to the heat sink (Abstract, L1-9; CL22, L9), because that shields the electromagnetic radiation generated by the electronic component (CL3, L37-44). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to combine the set of instructions of **Namiki** involving determining the distance of the point where the electromagnetic filed is estimated from the source of the field with the set of instructions of **Treiber et al.** that included designing a computer system comprising an electronic component such as a processor with a heat sink. One would be motivated because that permits designing a computer system limiting the amount of the electromagnetic radiation generated by the electronic component by the use of the heat sink and a conductor connected to the heat sink.

9.4 As per claim 16, **Namiki** teaches modeling characteristic radiation from the central processing unit as a modulated Gaussian pulse (Page 7, Para 0081); and

estimating the electromagnetic field produced by the central processing unit using finite differences in time domain (FDTD) to solve Maxwell's equation (Page 1, Para 0002 and Para 0004; Page 2, Para 0030; Page 3, Para 0044).

Namiki teaches determining the distance of the point where the electromagnetic filed is estimated from the source of the field (Page 1, Para 0004 and 0005). **Namiki** does not expressly

teach a computer system, comprising a central processing unit, a heat sink coupled to the central processing unit, and determining the distance of a central processing unit from a heat sink. **Treiber et al.** teaches a computer system comprising an electronic component such as a processor and dissipating heat from the electronic component using a heat sink and a conductor connected to the heat sink (Abstract, L1-9; CL22, L9), because that shields the electromagnetic radiation generated by the electronic component (CL3, L37-44). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to combine the computer system of **Namiki** involving determining the distance of the point where the electromagnetic filed is estimated from the source of the field with the computer system of **Treiber et al.** that included a computer system comprising an electronic component such as a processor with a heat sink. One would be motivated because that permits designing a computer system limiting the amount of the electromagnetic radiation generated by the electronic component by the use of the heat sink and a conductor connected to the heat sink.

Namiki does not expressly teach determining a number of fins and a number of bars of the heat sink. **Treiber et al.** teaches determining a number of fins (CL5, L7-19; CL5, L58-66), because the heat transfer fins facilitate convective heat transfer from the heat sink to the air that flows past the processor assembly(CL5, L15-19) and it is inherent that the quantity of heat transferred is proportional to the area of the fins and hence the number of the fins. **Treiber et al.** teaches determining a number of bars of the heat sink CL1, L37-42; Cl1, L64 to CL2, L17; CL5, L66 to CL6, L5; CL7, L56-62), because the bars (conductor) provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the electronic component such as the processor is mounted, thus shielding the electromagnetic radiation

generated by the electronic component (CL3, L37-44) and it is inherent that the shielding provided to the electromagnetic radiation is proportional to the number of bars and their size. It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Treiber et al.** that included determining a number of fins and a number of bars of the heat sink. One would be motivated because the heat transfer fins would facilitate convective heat transfer from the heat sink to the air that flows past the processor assembly and the quantity of heat transferred would be proportional to the area of the fins and hence the number of the fins; the bars (conductor) would provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the electronic component such as the processor was mounted, thus shielding the electromagnetic radiation generated by the electronic component and the shielding provided to the electromagnetic radiation would be proportional to the number of bars and their size

9.5 As per Claim 20, it is rejected based on the same reasoning as Claim 16, <u>supra.</u> Claim 20 is a heat sink for the computer system claim reciting the same limitations as Claim 16, as taught throughout by **Namiki** and **Treiber et al.**

10. Claims 2, 3, 7, 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Namiki** (U.S. Patent Application 2002/0099510) in view of **Treiber et al.** (U.S. Patent 6,664,463), and further in view of **Remsburg et al.** (U.S. Patent 5,804,875).

10.1 As per claim 2, **Namiki** and **Treiber et al.** teach the method of claim 1. **Namiki** does not expressly teach determining if the capacitive coupling exists between the heat sink and the central processing unit. **Remsburg et al.** teaches determining if the capacitive coupling exists between the heat sink and the central processing unit (CL1, L49-50; CL4, L11-13), because through such capacitive coupling the heat sink acts as an antenna for EMI radiation, thereby amplifying the effects of the radiation (CL1, L50-52). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Remsburg et al.** that included determining if the capacitive coupling exists between the heat sink and the central processing unit. One would be motivated because through such capacitive coupling the heat sink would act as an antenna for EMI radiation, thereby amplifying the effects of the radiation.

10.2 As per claim 3, **Namiki** and **Treiber et al.** teach the method of claim 1. **Namiki** does not expressly teach reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit. **Remsburg et al.** teaches reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit (CL1, L54-61; CL2, L34-37; CL4, L13-18), because as per **Treiber et al.** electromagnetic radiation can adversely affect circuit performance and threaten circuits in nearby equipment (CL1, L23-27). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Remsburg et al.** that included reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing

unit. One would be motivated because electromagnetic radiation could adversely affect circuit performance and threaten circuits in nearby equipment.

10.3 As per Claims 7 and 17, these are rejected based on the same reasoning as Claim 3, supra. Claims 7 and 17 are a method of designing a computer system and computer system claims reciting the same limitations as Claim 3, as taught throughout by **Namiki, Treiber et al.** and **Remsburg et al.**

10.4 As per Claim 13, it is rejected based on the same reasoning as Claim 2, supra. Claim 13 is a computer program product claim reciting the same limitations as Claim 2, as taught throughout by **Namiki, Treiber et al.** and **Remsburg et al.**

11. Claims 4, 5, 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Namiki** (U.S. Patent Application 2002/0099510) in view of **Treiber et al.** (U.S. Patent 6,664,463), and further in view of **Houghton et al.** (U.S. Patent 6,282,095).

11.1 As per claim 4, **Namiki** and **Treiber et al.** teach the method of claim 1. **Namiki** does not expressly teach determining if inductive coupling exists between the heat sink and the central processing unit. **Houghton et al.** teaches determining if inductive coupling exists between the heat sink and the central processing unit (CL2, L44-50), because inductive coupling causes RF voltage between the heat sink and the IC (CL2, 44-45); and such unintended voltage change may be large and could be interpreted as change in logic state thus resulting in logic failure of nearby

electronic device (CL1, L40-43). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Houghton et al.** that included determining if inductive coupling exists between the heat sink and the central processing unit. One would be motivated because inductive coupling would cause RF voltage between the heat sink and the IC; and such unintended voltage change might be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device.

11.2 As per claim 5, **Namiki** and **Treiber et al.** teach the method of claim 1. **Namiki** does not expressly teach reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit. **Houghton et al.** teaches reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit (CL2, L61-64; CL4, L1-12), because inductive coupling causes RF voltage between the heat sink and the IC (CL2, 44-45); and such unintended voltage change may be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device (CL1, L40-43). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Houghton et al.** that included reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit. One would be motivated because inductive coupling would cause RF voltage between the heat sink and the IC; and such unintended voltage change might be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device.

11.3 As per Claim 8, it is rejected based on the same reasoning as Claim 5, supra. Claim 8 is a method of designing a computer system claim reciting the same limitations as Claim 5, as taught throughout by **Namiki, Treiber et al.** and **Houghton et al.**

11.4 As per Claim 18, it is a computer system claim having all the limitations as in claim 16; in addition it has the limitation of reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit. **Namiki** and **Treiber et al.** teach the computer system of claim 16.

Namiki does not expressly teach reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit. **Houghton et al.** teaches reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit (CL2, L61-64; CL4, L1-12), because inductive coupling causes RF voltage between the heat sink and the IC (CL2, 44-45); and such unintended voltage change may be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device (CL1, L40-43). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Houghton et al.** that included reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit. One would be motivated because inductive coupling would cause RF voltage between the heat sink and the IC; and such unintended voltage change might be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Namiki** (U.S. Patent Application 2002/0099510) in view of **Treiber et al.** (U.S. Patent 6,664,463), and further in view of **Fox** (U.S. Patent Application 2002/0089449).

12.1 As per claim 9, **Namiki** and **Treiber et al.** teach the method of claim 6. **Namiki** does not expressly teach using a fast Fourier transform to translate time domain data to frequency domain. **Fox** teaches using a fast Fourier transform to translate time domain data to frequency domain (Page 1, Para 0009; Page 2, Para 0016), because Fourier transform transforms the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal may be broken into sinusoidal elements and the system response to each sinusoidal elements may be analyzed (Page 1, Para 0011); and fast Fourier transform performs Fourier transformation on digitized signal over a predetermined sampling period (Page 2, Para 0016). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Fox** that included using a fast Fourier transform to translate time domain data to frequency domain. One would be motivated because Fourier transform would transform the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal might be broken into sinusoidal elements and the system response to each sinusoidal elements might be analyzed; and fast Fourier transform would perform Fourier transformation on digitized signal over a predetermined sampling period.

13. Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Namiki** (U.S. Patent Application 2002/0099510) in view of **Treiber et al.** (U.S. Patent 6,664,463), and further in view of **Remsburg et al.** (U.S. Patent 5,804,875) and **Houghton et al.** (U.S. Patent 6,282,095).

13.1 As per claim 10, **Namiki** teaches modeling characteristic radiation from the central processing unit as a modulated Gaussian pulse (Page 7, Para 0081); and

estimating the electromagnetic field produced by the central processing unit using finite differences in time domain (FDTD) to solve Maxwell's equation (Page 1, Para 0002 and Para 0004; Page 2, Para 0030; Page 3, Para 0044).

Namiki teaches determining the distance of the point where the electromagnetic filed is estimated from the source of the field (Page 1, Para 0004 and 0005). **Namiki** does not expressly teach a method of manufacturing a computer system comprising determining the distance of a central processing unit from a heat sink. **Treiber et al.** teaches a method of manufacturing a computer system comprising an electronic component such as a processor and dissipating heat from the electronic component using a heat sink and a conductor connected to the heat sink (Abstract, L1-9; CL22, L9), because that shields the electromagnetic radiation generated by the electronic component (CL3, L37-44). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to combine the method of **Namiki** involving determining the distance of the point where the electromagnetic filed is estimated from the source of the field with the method of **Treiber et al.** that included manufacturing a computer system comprising an

electronic component such as a processor with a heat sink. One would be motivated because that permits manufacturing a computer system limiting the amount of the electromagnetic radiation generated by the electronic component by the use of the heat sink and a conductor connected to the heat sink.

Namiki does not expressly teach determining a number of fins and a number of bars of the heat sink. **Treiber et al.** teaches determining a number of fins (CL5, L7-19; CL5, L58-66), because the heat transfer fins facilitate convective heat transfer from the heat sink to the air that flows past the processor assembly(CL5, L15-19) and it is inherent that the quantity of heat transferred is proportional to the area of the fins and hence the number of the fins. **Treiber et al.** teaches determining a number of bars of the heat sink CL1, L37-42; Cl1, L64 to CL2, L17; CL5, L66 to CL6, L5; CL7, L56-62), because the bars (conductor) provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the electronic component such as the processor is mounted, thus shielding the electromagnetic radiation generated by the electronic component (CL3, L37-44) and it is inherent that the shielding provided to the electromagnetic radiation is proportional to the number of bars and their size. It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Treiber et al.** that included determining a number of fins and a number of bars of the heat sink. One would be motivated because the heat transfer fins would facilitate convective heat transfer from the heat sink to the air that flows past the processor assembly and the quantity of heat transferred would be proportional to the area of the fins and hence the number of the fins; the bars (conductor) would provide electrical contact between the heat sink and the and the surface of the conductive enclosures in which the

electronic component such as the processor was mounted, thus shielding the electromagnetic radiation generated by the electronic component and the shielding provided to the electromagnetic radiation would be proportional to the number of bars and their size

Namiki does not expressly teach reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit. **Remsburg et al.** teaches reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit (CL1, L54-61; CL2, L34-37; CL4, L13-18), because as per **Treiber et al.** electromagnetic radiation can adversely affect circuit performance and threaten circuits in nearby equipment (CL1, L23-27). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Remsburg et al.** that included reducing radiation noise by reducing capacitive coupling between the heat sink and the central processing unit. One would be motivated because electromagnetic radiation could adversely affect circuit performance and threaten circuits in nearby equipment.

Namiki does not expressly teach reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit. **Houghton et al.** teaches reducing radiation noise by reducing inductive coupling between the heat sink and the central processing unit (CL2, L61-64; CL4, L1-12), because inductive coupling causes RF voltage between the heat sink and the IC (CL2, 44-45); and such unintended voltage change may be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device (CL1, L40-43). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Houghton et al.** that included reducing radiation noise by reducing inductive coupling between the heat sink and the

central processing unit. One would be motivated because inductive coupling would cause RF voltage between the heat sink and the IC; and such unintended voltage change might be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device.

13.2 As per claim 14, **Namiki, Treiber et al.** and **Remsburg et al.** teach the computer program product of claim 13. **Namiki** does not expressly teach a fifth set of instructions, executable on a computer system, configured to determine if inductive coupling exists between the heat sink and the central processing unit. **Houghton et al.** teaches a fifth set of instructions, executable on a computer system, configured to determine if inductive coupling exists between the heat sink and the central processing unit (CL2, L44-50), because inductive coupling causes RF voltage between the heat sink and the IC (CL2, 44-45); and such unintended voltage change may be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device (CL1, L40-43). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the computer program product of **Namiki** with the computer program product of **Houghton et al.** that included a fifth set of instructions, executable on a computer system, configured to determine if inductive coupling exists between the heat sink and the central processing unit. One would be motivated because inductive coupling would cause RF voltage between the heat sink and the IC; and such unintended voltage change might be large and could be interpreted as change in logic state thus resulting in logic failure of nearby electronic device.

14. Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Namiki** (U.S. Patent Application 2002/0099510) in view of **Treiber et al.** (U.S. Patent 6,664,463), and further in view of **Remsburg et al.** (U.S. Patent 5,804,875), **Houghton et al.** (U.S. Patent 6,282,095) and **Fox** (U.S. Patent Application 2002/0089449).

14.1 As per claim 11, **Namiki, Treiber et al., Remsburg et al.** and **Houghton et al.** teach the method of claim 10. **Namiki** does not expressly teach using a fast Fourier transform to translate time domain data to frequency domain. **Fox** teaches using a fast Fourier transform to translate time domain data to frequency domain (Page 1, Para 0009; Page 2, Para 0016), because Fourier transform transforms the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal may be broken into sinusoidal elements and the system response to each sinusoidal elements may be analyzed (Page 1, Para 0011); and fast Fourier transform performs Fourier transformation on digitized signal over a predetermined sampling period (Page 2, Para 0016). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the method of **Namiki** with the method of **Fox** that included using a fast Fourier transform to translate time domain data to frequency domain. One would be motivated because Fourier transform would transform the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal might be broken into sinusoidal elements and the system response to each sinusoidal elements might be analyzed; and fast Fourier transform would perform Fourier transformation on digitized signal over a predetermined sampling period.

14.2 As per claim 15, **Namiki, Treiber et al., Remsburg et al.** and **Houghton et al.** teach the computer program product of claim 14. **Namiki** does not expressly teach using a fast Fourier transform to translate time domain data to frequency domain. **Fox** teaches using a fast Fourier transform to translate time domain data to frequency domain (Page 1, Para 0009; Page 2, Para 0016), because Fourier transform transforms the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal may be broken into sinusoidal elements and the system response to each sinusoidal elements may be analyzed (Page 1, Para 0011); and fast Fourier transform performs Fourier transformation on digitized signal over a predetermined sampling period (Page 2, Para 0016). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the computer program product of **Namiki** with the computer program product of **Fox** that included using a fast Fourier transform to translate time domain data to frequency domain. One would be motivated because Fourier transform would transform the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal might be broken into sinusoidal elements and the system response to each sinusoidal elements might be analyzed; and fast Fourier transform would perform Fourier transformation on digitized signal over a predetermined sampling period.

15. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Namiki** (U.S. Patent Application 2002/0099510) in view of **Treiber et al.** (U.S. Patent 6,664,463), and further

in view of **Houghton et al.** (U.S. Patent 6,282,095) and **Fox** (U.S. Patent Application 2002/0089449).

15.1 As per claim 19, **Namiki, Treiber et al.** and **Houghton et al.** teach the computer system of claim 18. **Namiki** does not expressly teach using a fast Fourier transform to translate time domain data to frequency domain. **Fox** teaches using a fast Fourier transform to translate time domain data to frequency domain (Page 1, Para 0009; Page 2, Para 0016), because Fourier transform transforms the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal may be broken into sinusoidal elements and the system response to each sinusoidal elements may be analyzed (Page 1, Para 0011); and fast Fourier transform performs Fourier transformation on digitized signal over a predetermined sampling period (Page 2, Para 0016). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the computer system of **Namiki** with the computer system of **Fox** that included using a fast Fourier transform to translate time domain data to frequency domain. One would be motivated because Fourier transform would transform the amplitude as a function of time to amplitude as a function of frequency; to determine the response of a system to complex input signal, the input signal might be broken into sinusoidal elements and the system response to each sinusoidal elements might be analyzed; and fast Fourier transform would perform Fourier transformation on digitized signal over a predetermined sampling period.

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 703-305-0043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska, can be reached on (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.

K. Thangavelu
Art Unit 2123
May 8, 2004

KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER